

NEWS

Volume 4 Number 2

Summer 1999

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Eight take home new DMSO M&S awards

By Sherrel Mock
DMSO Public Affairs

Eight winners have been selected for the first Defense Modeling and Simulation Office (DMSO)-sponsored Modeling and Simulation (M&S) Awards. Awards will be presented on June 2 at 4 p.m. during the Eighth Annual DMSO Industry Days (June 1-4), at the Sheraton Premiere at Tysons Corner in Vienna, Va.

Eighty-six nominations were received during the two-month nomination period that ended Feb. 28.

The awards recognize both government and non-government achievement during Fiscal Year 1998 in support of Department of Defense (DoD) M&S objectives. Eight individuals or teams — one government and one non-government — were selected in each of four categories. The first three categories consist of the M&S functional areas — training, analysis and acquisition. The fourth category, a cross-functional area, considers those endeavors that impact all aspects of the DoD M&S effort.

The seeds for the new M&S awards program were sown at last year's DMSO Industry Days when Air Force Col Kenneth Konwin, DMSO Director, said the DMSO would take the lead in finding a way to appropriately recognize the exceptional work being done in the DoD M&S community by both government and non-government people and organizations.

The criteria for each of the awards were derived from the charters and other defining documents of the three M&S functional area

See **DMSO M&S AWARDS**, p. 8

DMSO M&S Award Winners

ACQUISITION CATEGORY:

— Government Team: Joint Strike Fighter (JSF) Virtual Simulation Based Acquisition Team, Air Force Research Lab, Wright-Patterson AFB, Ohio, for the JSF Virtual Simulation Based Acquisition Program
— Non-Government Team: Advanced Amphibious Assault Vehicle M&S Integrated Process Team, General Dynamics Corporation, Woodbridge, Va., for the Virtual Integration and Assembly (VI&A) Program

ANALYSIS CATEGORY:

— Government Team: Joint Warfare Analysis Center Military Logistics Branch, Joint Warfare Analysis Center, Dahlgren, Va., for the Red Military Logistics Model Program
— Non-Government Team: Joint Warfighting Program Trailblazer Federation Team, MITRE Corporation, McLean, Va., for the Trailblazer Federation for Experimentation Program

TRAINING CATEGORY:

— Government Individual: Major Stephen K. Iwicki, U.S. Army, Headquarters, Department of the Army, Deputy Chief of Staff for Intelligence, Arlington, Va., for the Advancement of Command, Control, Communications, Computers Intelligence, Surveillance and Reconnaissance (C4ISR) Modeling for the Future Project
— Non-Government Team: Knowledge Acquisition Team, Veridian Corporation, Arlington, Va., for the Conceptual Modeling of U.S. Intelligence Processes Program

CROSS-FUNCTIONAL CATEGORY:

— Government Team: Logistics Integration Agency Rock Drill Team, U.S. Army Logistics Integration Agency, Alexandria, Va., for the Logistics Rock Drill Model Program
— Non-Government Team: Synthetic Environment Data Representation and Interchange Specification (SEDRIS) Team, Alexandria, Va., U.S. Army Simulation, Training and Instrumentation Command (STRICOM), for the SEDRIS Program

Details for each winner's program will be available on the DMSO Web site at <http://www.dmsomil/> on June 2.

DMSO Industry days showcase DoD M&S

The eighth annual Defense Modeling and Simulation Office (DMSO) Industry Days, held June 1-4, in Vienna, Va., presented the latest modeling and simulation (M&S) trends and developments in the DoD and industry to government/military and industry executives, strategic planners, program managers and senior technical managers.

The event is sponsored by the DMSO, the National Training Systems Association (NTSA), and

the M&S Industry Steering Group of the National Defense Industrial Association.

Presentations, DMSO M&S Award winners' program descriptions and other conference information will be available on the DMSO Web site at <http://www.dmsomil/> beginning on June 2.

Stop by the Web site and see the 'new' look. Let us know what you think -- send your comments to ASK_DMSO@msis.dmsomil.

Director's Corner

By Col Crash Konwin, USAF



Photo by Steve Wilson

"Context is Worth Thirty IQ Points"

During the last year, my Director's Corners have focused on one view of the essential elements of success – People, Partnerships, and Pragmatism. While these are what I believe are necessary elements, they are by no means sufficient. The title of this article, paraphrased from a comment from the podium at the Army SMART 99 conference in San Antonio, suggests another important dimension of every challenge – *Perspective*.

Seeing the same thing from multiple viewpoints, depending on your position, offers insights into the context of many challenges. In the modeling and simulation (M&S) development and application areas, dealing with the multitude of perspectives can be overwhelming at times, so how does one cope with this challenge? I suggest taking a simple, but thoughtful, and complete view of the situation – *Think Strategically, Plan Operationally and Execute Tactically*.

Think Strategically – Understand the intent contained within key National and Departmental strategy documents. Ask yourself how do you contribute to the "Big Picture" – today and in the longer term? Are there issues that are benign in your project or organization's day-to-day functioning that could have non-trivial implications when they are not considered? At the end of the day, can you answer the "Who cares?" question when people consider the utility of what your team is trying to accomplish. In military thinking, it echoes the suggestion that

"... Think Strategically, Plan Operationally and Execute Tactically."

you need to think of the information needs of the commander two levels up from your current position and seek to consider it and provide it in a responsive manner – both routinely and on an episodic basis.

Plan Operationally – When you execute your project or program, have you considered how it fits in with other complementary activities? Where are the key integration and collaboration points during which your responsibilities intersect with others? During the recent announcement of Hall of Fame hockey player Wayne "The Great" Gretsky's retirement, a sports announcer summarized what set him apart from the others in his field: "Others respond rapidly to where the puck is now; Gretsky has the unique ability to see and respond to where the puck will be in the future." In both military and business terms, you have to have a "campaign plan" in which you thoughtfully extend the purpose, funding needs and key activities of your project from the present into the POM horizon future. In other words, plan for your project's success: transition to users and sustain-

See DIRECTOR'S CORNER, p. 3

DMSO NEWS

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DMSO News is published quarterly by the Defense Modeling and Simulation Office, 1901 North Beauregard Street, Suite 500, Alexandria, Virginia, 22311-1705.

Views and opinions are not necessarily the official views of, nor endorsed by, the U.S. Government or the Department of Defense.

Direct comments or questions about the newsletter and requests to receive a hard copy subscription to the editor at the above address, via telephone at (703) 998-0660, or via e-mail at editor@msis.dmsi.mil.



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DMSO welcomes new deputy director, COL Crain, and new Ops Division chief, CAPT (sel) Johnson



COL Wm. Forrest Crain

he served as Chief of Operational Capabilities Assessment (Southwest Asia) with the Center for Army Analysis (CAA).

He is married to Maureen Laughlin and has two sons, Jared and Adam.

Army Colonel Wm. Forrest Crain joined the Defense Modeling and Simulation Office (DMSO) as the deputy director on May 24.

Crain's previous assignment was Chief, Strategic Plans, Multi National Division (North), in Tuzla, Bosnia.

Prior to his assignment in Bosnia,



CAPT (sel) David Johnson

squadron's 61st commander. He has 3500 Pilot hours in the P-3 aircraft and has been an instructor pilot in five squadrons.

Johnson is married to Wendy Williams and has three children, Jennifer, Ryan and Peter.

Captain (select) David Johnson is currently a student at the National War College, where he will receive a masters' degree in National Security Strategy. He will join the DMSO following graduation in June.

Johnson has served in a variety of aviation and shipboard assignments, to include Executive Officer of Patrol Squadron Eleven (VP-11) where he participated in operations over Bosnia and Herzegovina. After a year as Executive Officer of VP-10 "Red Lancers" he became the

Director's Corner

Continued from p. 2

ment, while ensuring you are aligned with the overall organization's objectives and likely funding resources. Thoughtfully laying out your plan will allow others to sense opportunities for collaboration far enough in the future that the true synergy of the projects can be leveraged to the maximum.

Execute Tactically – Once you have received your project's plan approval and funding, you must "keep your eye on the ball" and not get distracted from the day-to-day execution tasks by the avalanche of new and seductive information. This strategy does not rule out spiral development, but reminds everyone on the team that the spirals themselves need to be disciplined streams of events with measurable outcomes/products and not solely "best effort" commitments of resources toward an overly broad objective. General George Patton once said, "A good plan executed today is better than the perfect plan next week." Unless you and your team maintain the discipline of productive day-to-day progress on your projects, you will not be able to maintain cost, schedule and performance with acceptable risk.

As in every complex challenge, the right combination of thinking, and action, and keeping the right perspective for a given situation, will depend on the specifics. By challenging yourself to consider each of the above three perspectives, you will best prepare yourself and your team for success on all your undertakings. If you have considered in advance the most likely contexts in which your superiors will ask you about your responsibilities, you'll look amazingly intelligent with your plans of action, project execution and product de-

liveries – certainly the equivalent of operating with a boost of 30 IQ points!

Cheers,

Crash

Professional Postscripts – **LTC Harry Thompson, USA**, Chief of DMSO's Operations Division, will be retiring from the Army at the end of June. Several of you know personally the energy and determination that marked Harry's execution of all his assigned tasks. His bulldog tenacity and unbelievable staying power marked his lasting contribution to the Army, the DMSO, and the greater DoD and International M&S community. We wish him and his family God speed in this next phase of his life. Joining the staff this summer will be **COL Wm. Forrest Crain, USA**, who will be the new Deputy Director. **CAPT (sel) Dave Johnson, USN**, will be arriving to take up leadership of the Operations Division.

Additionally, I want to publicly thank a few of the key community members that were instrumental in successfully turning the FY 98 M&S Awards Program from an idea to a reality: The **National Training Systems Association (NTSA)** for co-sponsoring the awards with the DMSO; the supervisors within the M&S community who nominated their organization's outstanding work, both government and industry members; the Functional Area Review Groups led by **Don Bates** (Analysis), **Robin Frost** (Acquisition) and **Dan Gardner** (Training); and **Jeff Guild**, Lt. Col. Thompson's Project Officer, whose focus, dedication and energy "made it happen." Finally, I wish to applaud the individual and team member efforts of the award winners and all the nominees themselves – I am convinced that your contributions reflect the ultimate goal of M&S in support of the Department of Defense mission – "A Better Product for the Warfighter."

Guest's Corner

JADS a powerful tool for acquisition, T&E professionals to add to tool boxes

By Col Mark Smith, USAF

Test Director, Joint Advanced Distributed Simulation
Joint Test Force

The Joint Advanced Distributed Simulation Joint Test Force (JADS JTF) has enjoyed a long and positive relationship with DMSO, and I appreciate the opportunity to share some of the fruits of this relationship in this issue of the *DMSO News*.

Based on strong support from the Services, JADS was chartered by the Office of the Secretary of Defense (OSD) in 1994 to determine the utility of advanced distributed simulation (ADS) for both developmental and operational test and evaluation (DT&E and OT&E). This was in response to the culmination of several factors. First, the T&E and acquisition communities have always been faced with significant limitations in conducting rigorous T&E of their systems under test (SUT). Examples of these limitations include too few test articles, insufficient threat density, and limitations to open-air electronic emissions. Add to this the fact that the systems being fielded now are increasingly complex and interactive. Finally, budgets have been driven down over the last several years, and the T&E and acquisition communities have taken large hits. Add these together and we're faced with the need to do SOMETHING different in order to do a credible job in fielding quality systems for our warfighters.

About this time, much ado was being made about ADS. It was being used successfully for training applications. Proponents claimed that ADS could work well as a tool for T&E, overcoming many of our traditional limitations and allowing us to provide better testing of our complex systems ... and save money to boot. However, people in the T&E and acquisition communities weren't in a hurry to bet their program on a new, unproved methodology. They were unconvinced that ADS would perform to the rigor of T&E, provide valid data, be reliable, and not break the bank. So, JADS was OSD's and the Services' strategic plan for finding out if ADS was a useful tool for DT&E and OT&E applications.

Based on the broad charter JADS received from OSD, JADS created an operational plan designed to provide as broad an examination of ADS as possible for the breadth of T&E in light of our limited life span and resources. Our approach has been to take three totally differ-

ent systems, which have already undergone traditional testing, then replicate the test events using ADS as the test methodology. This would provide as broad an examination of the technology as possible. Also, we would learn from and leverage off of other programs using ADS in a means compatible with the rigor required of T&E. This has helped us fill in the gaps and provide a comprehensive answer to the community on the utility of ADS.



With our operational plan in place, JADS stood up three test teams responsible for tactical execution of their tests. They used the integrated process team (IPT) approach with participating organizations and representatives from their field of testing. They also made investments in time, manpower and money in developing the various tools needed to conduct their test.

Space limits prohibit me from spending much time reviewing these JADS tests. Here's a brief synopsis. The purpose of the System Integration Test was to determine the utility of ADS for precision guided munition T&E. It was conducted in two phases. The Linked Simulators Phase linked laboratories and test facilities together to perform closed-loop effectiveness testing of an AIM-9M air-to-air missile against a countermeasure-dispensing threat. The Live Fly Phase linked two live F-16s, shooter and target, into a hardware-in-the-loop laboratory hosting an AIM-120 air-to-air missile. Our End-to-End Test was designed to determine the utility of ADS for command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) systems. The Joint Surveillance Targeting Attack Radar System (JSTARS) was selected as

our SUT. The test consisted of four phases, culminating with an ADS-enhanced live open-air test of the JSTARS while in flight. The Electronic Warfare (EW) Test was our first opportunity to examine the DoD's High Level Architecture (HLA) to determine its utility to support T&E. My EW Test Team Lead, Major Darrell Wright, has an accompanying article detailing what they did and what they learned. In a nutshell, though, we used ADS to link together EW test facilities to conduct effectiveness testing of the ALQ-131 self-protection jammer.

How did the tests go? Pretty well! What did we learn? A lot! Seriously, these two areas would make fine articles in themselves; I just don't have the space here. The bottom line is that we've determined there's significant utility in using ADS in the T&E of a system. How much utility depends on the type of system and the type of testing. Also, like any tool, ADS has its strengths and weaknesses. But, in general, ADS is a powerful tool for the T&E and acquisition professionals to add to their tool box. Its use supports the precepts you've learned regarding the Simulation Test and Evaluation Process and Simulation Based Acquisition.

JADS continues to work hard in the T&E and acquisition communities to educate them on the use of ADS, equip them with the tools they need, and to institutionalize the legacy products coming out of this joint test program. For much more information on the JADS experience, check our Web site at <http://www.jads.abq.com/>, or e-mail me at smith@jads.kirtland.af.mil.

My thanks to the DMSO for the superb support they provided JADS in developing and executing our EW Test. Without a doubt we couldn't have succeeded without their expertise. I see HLA developing into a superb tool for the broad DoD community, and I appreciate the leadership DMSO is providing to make that a reality.

Col Smith has served as the JADS Test Director since it was established in 1994. He also serves the M&S community as the chairman of the Executive Committee of the Simulation Interoperability Standards Organization (SISO).



JADS completes final phase of HLA EW test

By Maj Darrell Wright, USAF

The Joint Advanced Distributed Simulation (JADS) Joint Test Force completed the final phase of its DoD High Level Architecture (HLA)-based Electronic Warfare (EW) Test on April 23.

This was the last phase in a series of tests designed to investigate the utility of distributed simulation technology for test and evaluation (T&E) and to address T&E community concerns with the HLA. Using advanced distributed simulation (ADS) and HLA-compliant federates, JADS seamlessly integrated an Air Force National Guard F-16 equipped with a self-protection jammer and installed in an instrumented Navy anechoic chamber; four human/hardware-in-the-loop threat simulators; software models providing flight profile information; background sources of radio frequency energy; and integrated air defense system terminal threat hand-off cueing. Test control systems and real-time analysis capabilities were also integrated in the HLA federation.

This highly successful EW test was the first of its kind to use ADS on operational weapons systems in an installed system test facility augmented by external threat simulators gathering test and evaluation quality data. Test participants were the Air Force Electronic Warfare Evaluation Simulator (AFEWES), Fort Worth, Texas; the Air Combat Environment Test and Evaluation Facility (ACETEF), Patuxent River Naval Air Warfare Center Aircraft Division, Md.; and the JADS Test Control and Analysis Center, Albuquerque, N.M.

This was the second ADS-based test for the JADS EW Test team. The first occurred in December 1998. It used a digital system model in place of the self-protection jammer. This equally successful test was the first of its kind to use ADS to link a software model of an EW system to high fidelity human-in-the-loop threat simulators. Both tests illustrate how ADS might enhance the T&E process and provide the test community with another tool to overcome traditional test resource limitations.

We designed our ADS-based tests to recreate the results of traditional tests. The first was a series of open-air range flight tests using the F-16 and the self-protection jammer. Two weeks of hardware-in-the-loop testing using the jammer and the AFEWES threat simulators supplemented the open-air testing. These two traditional tests provided the baseline data necessary for driving the flight profile, background source and threat hand-off cueing models. In addition, we used the baseline data to verify that the ADS architecture was accurately recreating the environment seen in the traditional tests.

The JADS EW Test was chartered in August 1996. We formed an integrated product team (IPT) to design and execute the ADS-based tests as well as the traditional tests. In April 1997, the test approach, including the use of the HLA, was baselined and execution began. One month later the IPT created the Federation Concept Model. It identified all the objects, interactions and attributes, as well as latency budgets and message formats. Open-air range flights began in August 1997. In December 1997, JADS built its network test bed and began testing the computer, communications and runtime infrastructure (RTI) integration. JADS took initial delivery of key federate software components in August 1998 and began integration of the federation. Open-air range testing ended that month. The final software components were delivered, and we completed acceptance testing of all federates in November 1998. Immediately after the execution of our first ADS-based test, we reviewed our execution and began detailed planning for the second test. Integration and acceptance testing was completed one day before the test was scheduled to begin.

Both tests used essentially the same network topology, federation object model, and interface control document. Minor changes were incorporated between tests to correct problems encountered. Six of the seven federates were common to both tests. Only the federate that contained the jammer changed. We designed the messages passed between the federates to be used in more complex scenarios, such as those that a system developer would need to fully test a new self-protection jammer. While we used only seven federates, some of those federates were actually gateways into complex facilities, or to non-HLA-compliant systems. In both tests there were three gateway federates. The two most complex were the gateways for the AFEWES and ACETEF facilities. Behind the AFEWES gateway were four human/hardware-in-the-loop simulators and one radio frequency waveform generator. This facility accounted for 35 of the 45 total number of computers in simultaneous operation during that phase. During the April 1999 test, ACETEF debuted its flexible gateway at its facility, providing access to 11 computers and simulators supporting the test.

Editor's Note: This test was a continuation of the process begun by the DoD Architecture Management Group (AMG) in 1995 of using actual simulation environments to stress and test the HLA specification.

Data analysis is well underway and report writing is not far behind. Over the next few months we will be producing a series of reports documenting our results as well as our lessons learned and making many of these available to the whole HLA community. We will post our documents on the JADS Web site at <http://www.jads.abq.com/>, as well as present the results at several modeling and simulation forums such as the fall Simulation Interoperability Workshop.

This test would not have been possible without the strong support of the Defense Modeling and Simulation Organization (DMSO). Because the HLA was evolving rapidly and there were concerns that HLA would not meet the needs of the T & E community, JADS agreed to be a test case for high performance T&E applications. The DMSO agreed to help us integrate the RTI into our architecture.

As a test case, we have been on the leading edge of several HLA advances: the creation of the Federation Execution Planners Workbook; the development of RTI/network performance benchmark tools; the refinement of the Object Model Development Tool suite; HLA compliance testing for classified federates; the Verification, Validation and Accreditation Overlay to the Federation Execution and Development Process (FEDEP); and several changes to the FEDEP itself.

We have sewn the seeds for several more advances that will help the community better use the HLA. These advances include expanding the FEDEP to include more detailed design documents, such as interface control documents; creating better methods of articulating RTI performance and the associated testing tools; and creating better documentation of the existing RTI products to allow users to tune their installation of the RTI. We look forward to these seeds coming to fruition. It is amazing how far the HLA has come during the short time we've been partners. It is off to a great start. Keep up the momentum.



Maj Wright is the Electronic Warfare Team Lead for the Joint Advanced Distributed Simulation Joint Test Force (JADS JTF).

For more information contact him at (505) 846-1015 or wright@jads.kirtland.af.mil.

Visit the JADS Web site at <http://jadsweb.kirtland.af.mil/>.

M&S Education Course Descriptions

M&S Staff Officer Course (MSSOC). The five-day MSSOC, flagship of the M&S Education Project, targets newly assigned personnel with little or no M&S experience. The MSSOC provides a broad familiarization with M&S policies, organizations, programs, activities, issues, and key players. MSSOC alumni, numbering over 600, include military, DoD civilian, DoD contractors, and allies from across the M&S functional areas of training, acquisition and analysis. The MSSOC has been conducted four times this year, twice in Alexandria, Va., and once each in Orlando, Fla. and Seoul, Korea. The Korean MSSOC was conducted at the Korea Battle Simulation Center (KBSC) for 22 Koreans, 17 U.S., and two Japanese students. The Japanese students were noteworthy in that they represented the first Japanese military to participate in training with the Koreans at the KBSC. See photos, p. 7.

MS 101. MS 101 is a half-day tutorial designed to be delivered to large audiences, ideally at conferences, seminars and symposiums. Presenting basic DoD M&S information, it relies heavily on multimedia and enhanced graphics to present course information. MS 101 made its debut in December 1998 at the Interservice and Industry Training, Simulation and Education Conference (IITSEC) in Orlando, Fla., to approximately 600 attendees. Since then, it has been delivered to a combined USSOCOM/USCENTCOM audience, the KBSC MSSOC, and to 22 Korean attendees at the Korea Institute for Defense Analysis (KIDA). Scheduled presentations include the DMSO Industry Days tutorial session in June and the Naval Postgraduate School in July.

Executive Level Orientation (ELO). Presented by the senior DMSO staff, the ELO provides the senior DoD executive with a broad overview of current DoD M&S policies, organizations, and issues. ELO enhances the senior executive's ability to make decisions involving the use of M&S. The ELO is available in a variety of lengths, from 60 to 90 minutes, in order to accommodate the busy executive's schedule. During its development phase, the ELO was presented in 31 settings (24 outside of DMSO) over a four-month period starting in mid-January. DMSO sessions included: MSRR/MEL Users Conference, and an MSSOC. Test sites outside DMSO included: Joint Staff (J-7); RADM Ellis, Oceanographer of the Navy; National Defense University's Information Resources Management College; Defense Leadership and Management Program; Army War College; Office of Naval Research (ONR); Col Ales—commander of the Air Force Agency for M&S, senior Korean military and civilian officials at KBSC and KIDA, and senior representatives from the Service M&S offices, to include Maj Gen Hess and Dr. Henningsen, AF/XOC; Dr. Michael Bailey, U.S. Marine Corps' Office of Science and Innovation; and COL Collier, Army Model and Simulation Office.

Program Management Office (PMO) M&S Workshop. The newest DMSO education product responds directly to the needs of the Acquisition community. This one-day workshop assists the Program Manager (PM) and his or her staff in planning for the use of M&S throughout the product lifecycle. Taught on location and targeted specifically toward the PM's staff, the workshop provides sources of DoD M&S information and tools for the PM staff's use. Currently in the final stages of development, the PMO M&S Workshop has been presented to Service acquisition and M&S office representatives, faculty members from the Defense Systems Management College, industry representatives, and the Marines' Advanced Amphibious Assault Vehicle program office.

M&S education in full swing, two new products in works



"The DoD M&S Education effort is in full swing and great demand," said Tom Stanford, Modeling & Simulation (M&S) Education project lead for the Defense Modeling and Simulation Office (DMSO). "As of Industry Days on June 1-4, the DMSO's suite of education opportunities includes a wide variety of High Level Architecture (HLA) resident and CD-ROM training opportunities, an initial Synthetic Environment Data Representation and Interchange Specification (SEDRIS) overview and selected technical training, the Master Environmental Library (MEL) CD-ROM, and four basic M&S courses.

"Folks should check the DMSO M&S Education Project World Wide Web site at <http://www.education.dmsomil/> for the course best suited for their needs," he added. "Better yet, if they attend the DMSO Industry Days they can come by the HLA, SEDRIS, MEL, or M&S Education kiosks in the DMSO exhibit area and talk to DMSO's M&S education team members. We'll provide all the information they need to participate in this important service."

Two important new M&S education products are under way, according to Stanford. The first, the **Electronic Education Library (EEL)**, will provide a Web-based capability for accessing a variety of M&S subject matter, to include course content and diverse reference materials. When fielded, it will provide a step-by-step methodology for self-learning or researching information on key M&S issues. "A prototype of this product will be demonstrated at the M&S Education kiosk in the DMSO booth during Industry Days," he said. "I encourage attendees to stop by and see it. We're interested in their feedback on what kinds of information and services the EEL should provide, and how it can best support them in the M&S community."

The second new product is a **NATO M&S Staff Officer Course (NMSSOC)**. The NATO M&S Master Plan (NATO MSMP) describes a need for M&S education to the NATO community. The U.S., as a national contribution to executing the NATO MSMP, will develop and deliver a pilot NMSSOC this fall. The proposed concept and development strategy for this course was well received when presented during the International Training and Education Conference (ITEC) at The Hague, Netherlands, in April, according to Stanford.

See M&S EDUCATION, p. 9

HLA Training Opportunities

The DMSO sponsors a variety of training on the DoD High Level Architecture (HLA), from briefings and tutorials at conferences, workshops and other general educational outreach events, to training events to address specific DoD-component requirements. The DMSO offers an HLA training program geared for all levels and types of DoD M&S users. The program offers specialized sessions for DoD agencies and M&S organizations. Open-registration, regional training events present a comprehensive introduction to the HLA, and a hands-on training program is offered for HLA developers and users. There is no charge to attendees or sponsoring organizations for DMSO-provided HLA training, other than travel and per diem costs for attendees.

In addition to the regional and hands-on training being offered for the HLA, the DMSO is sponsoring HLA course development at universities through a partnership with the McLeod Institute. The following training courses are also available on CD-ROM -- *HLA Overview*, *HLA Time Management*, *Adopting Your Simulation to HLA*, *HLA RTI Primer*

To learn more about HLA training, register for one of the regional or hands-on events, or request a CD, please visit the HLA Web site at <http://hla.dmsomil/>.

SEDRIS and MEL Training Opportunities

The Synthetic Environment Data Representation and Interchange Specification (SEDRIS) project team has provided informal training to hundreds of customers via technical conferences and workshops. More formal classroom sessions are planned for 2000. A variety of educational documentation is also available at the SEDRIS Web site at <http://www.sedris.org/>.

The Master Environmental Library (MEL) CD-ROM tutorial has been widely distributed, and in conjunction with the larger M&S Resource Repository (MSRR) system, has been demonstrated at several users/implementers conferences. Additional information is available on the MEL Web site at <http://www.mel.dmsomil/>.

DMSO takes M&S Education to Korea

See article, p. 6, column 1, for details.



LTC Harry Thompson greets Dr. Dong Joon Hwang, Vice President, Korea Institute for Defense Analysis, and COL Hugo Keyner, JUSMAG Korea. LTC Thompson presented the DoD M&S Executive Level Orientation to 37 Korean attendees. The DMSO M&S Education Team presented MS 101 to 22 Korean attendees.



LTC Harry Thompson greets MG Ahn, Korean Army. MG Ahn delivered the welcome address to the class and received the DoD M&S Executive Level Orientation from LTC Thompson.

MSSOC Schedule for the remainder of 1999

MSSOC 99-4	San Diego, CA	7-11 June
MSSOC 99-5	Camp Smith, HI	14-18 June
MSSOC 99-6	Warrior Prep Center, GE	19-23 July
MSSOC-NSC	Fort Leavenworth, KS	9-13 Aug
MSSOC 99-7	Alexandria, VA	20-24 Sep
MSSOC 99-8	Wright-Patterson AFB, OH	TBD Oct
MSSOC 99-9	Alexandria, VA	15-19 Nov
MSSOC 99-10	Orlando, FL	13-17 Dec

For additional information, or to apply online visit the MSSOC Web site at <http://www.education.dmsi.mil/>.



Japanese students — Mr. Hirotaka Higuchi and MAJ Shiro Saito — participate in the KBSC MSSOC. Their attendance was the first Japanese participation in a training event at the KBSC.



Looking for a Date?

Need the dates, registration information, a point of contact, or the web site for an upcoming M&S conference, but don't know where you put the brochure?

Visit the new "M&S Calendar" at
<http://www.msosa.dmsi.mil/mscalendar/>



8th CGF conference held in May in Orlando

By Dr. Ruth P. Willis

DMSO Human Behavior Representation Project Manager

The Eighth Computer Generated Forces and Behavioral Representation Conference was held May 11-13 in Orlando, Fla.

The goal of these conferences is to provide a forum within which to consider the issues associated with representing human behavior through computer generated forces. During the three-day event, researchers and developers discussed issues ranging from cognitive modeling to improving model architecture in 16 parallel sessions.

On Tuesday morning, Dr. Michael Bailey and Mr. Jim Dunnigan delivered keynote presentations at the opening Plenary Session. Dr. Bailey, the U.S. Marine Corps' principal analyst for modeling and simulation, spoke about the Marine Corps' focus on the urban warrior. Mr. Dunnigan, noted wargame developer and author, offered his insights into the wargaming process. The Tuesday evening Plenary Session introduced the work to date on the Human Starter Simulation Object Model project. The Wednesday evening Plenary Session focused on the NATO-sponsored Long Term Scientific Study on Human Behavior Representation.

For the first time, there was cooperative sponsorship of the conference and participation by two Department of Defense agencies and three Services – the Defense Modeling and Simulation Office, the Defense Advanced Research Projects Agency, the U.S. Army Simulation, Training and Instrumentation Command, the Office of Naval Research, and the U.S. Air Force Research Laboratory. This year the conference was also affiliated with the Simulation Interoperability Standards Organization (SISO), the International Simulation Advisory Group and the United Kingdom's Defence Evaluation and Research Agency (DERA).

Bound conference proceedings are available from the University of Central Florida's (UCF) Institute for Simulation and Training (IST), which supported the event. Visit the IST World Wide Web site at <http://www.ist.ucf.edu/> or call (407) 658-5000. Conference papers are available online through the SISO Web site at <http://www.sisostds.org/cgf-br/8th/view-papers.htm>.

For more information contact Dr. Ruth P. Willis, the DMSO point of contact for Human Behavior Representation, (703) 824-3438, rpwillis@msis.dmsomil.

MSIAC

Continued from p. 16

Applications International Corporation (SAIC), Innovative Management Concepts (IMC), Innativ (formerly Augins Defense Services, Inc.), Camber Corporation, Virtual Technology Corporation, ITT, Skyward, University of Central Florida's Institute for Simulation and Training, Georgia Tech Research Institute (GTRI), Nichols Research Corporation and Trident Systems.

"The IITRI team brings extensive IAC management experience from operating five other IACs, a background in military operations, warfighter perspective and knowledge-based information processing to the MSIAC," according to Barry Watson, Group Senior Vice President, Advanced Technology Group, IIT Research Institute.

The MSOSA will provide MSIAC information at the upcoming DMSO-sponsored eighth annual "State of Modeling and Simulation Briefing to Government and Industry," or DMSO Industry Days, June 1-4, at the Sheraton Premiere at Tyson's Corner, 8661 Leesburg Pike, Vienna, Va. (Registration information, agenda and directions to the hotel are available online at <http://www.trainingsystems.org/Events/91hdmsomil.htm>.)

"For further information, please stop by the MSOSA booth in the exhibit area at Industry Days," Thompson said, "and watch the DMSO Home Page (<http://www.dmsomil/>) for additional details and points of contact as the MSIAC becomes operational."

Contact the MSOSA for MSIAC information at (703) 998-1623/1624, (800) 510-6399,

fax (703) 998-1625, or e-mail msosahelps@msosa.dmsomil. The MSOSA Web site is at <http://www.msosa.dmsomil/>.

For information about the IITRI team contact Barry Watson, Group Senior Vice President, Advanced Technology Group, IIT Research Institute, 4409 Forbes Blvd., Lanham, Md. 20706, phone 301-918-1530, fax 301-918-1551, e-mail bwatson@iitri.org.

The DoD Public Affairs news release regarding the contract award is available online at http://www.defenselink.mil/news/May1999/c05181999_ct241-99.html.

DMSO M&S Awards

Continued from p. 1

councils and the DoD M&S Working Group (MSWG), all subordinate organizations of the DoD's Executive Council for M&S (EXCIMS).

Nominations in the functional areas were reviewed by awards boards established by the corresponding functional area councils of the EXCIMS. A select subcommittee of the MSWG reviewed nominations in the cross-functional area. To ensure an equitable representation in the non-government sector, selected members of the M&S Industry Steering Group (ISG) participated in the selection process. Finally, the EXCIMS, chaired by Dr. Delores M. Etter, Deputy Under Secretary of Defense for Science and Technology, reviewed the recommendations for approval of the awards.

DMSO Industry Days registration information, agenda and directions to the hotel are available online at <http://www.trainingsystems.org/Events/91hdmsomil.htm>.

Flemming Award

Continued from p. 16

Magazine, selects 11 winners annually in three categories — four from the administrative area, four from the scientific area and three from the applied science area. The awards honor outstanding men and women from all areas of the federal government who have made extraordinary contributions to the federal government and who have less than 15 years of service.

Over 500 people have received the award since it was established in 1948 by the Washington, DC, Downtown Jaycees. Previous winners include Senator Patrick P. Moynihan (1965) and Elizabeth Hanford Dole (1971). Two other 1998 recipients were also from the DoD, both from the U.S. Air Force — Jeffrey S. Zabinski, Ph.D., in the Scientific category, and Capt Jon M. Anderson in the Applied Science category.

Winners of this year's 50th anniversary awards will be recognized on June 10 at a black-tie dinner at GWU. Winners will also be featured in a special section in the June issue of *Government Executive*.

The award takes its name from Dr. Arthur S. Flemming, who began seven decades of civil service in 1939. According to the Flemming Awards Web site at <http://www.gwu.edu/~flemming/>, he served as president of three universities; director of the Office of Defense Mobilization; secretary of Health, Education and Welfare; chairman of the U.S. Commission on Civil Rights; and co-chair of Save Our Security Coalition. President Clinton awarded Flemming the Medal of Freedom in 1994 in recognition of his peerless dedication to his country.

NATO moving to implement M&S Master Plan; planning under way for conference, Oct. 28-29

By Leon Armour

DMSO International Relations

The North Atlantic Treaty Organization (NATO) is moving forward to implement several initial recommendations of the NATO Modeling and Simulation Master Plan (NMSMP), namely, creating a NATO Simulation Policy Group (NSPG).

This senior-level body ensures the coherent management and coordination of Modeling and Simulation (M&S) activities across the Alliance and oversees the Simulation Coordinating Office (SCO), which manages the day-to-day M&S activities in NATO. The NSPG reports to the NATO Research and Technology Board (RTB), which in turn reports to the Conference of National Armaments Directors (CNAD) and the Military Committee (MC).

The RTB presented the NSPG Terms of Reference (TORs) for approval at the CNAD meeting in May. The TORs were approved with some minor changes, most notably

renaming the NSPG the NATO Modeling and Simulation Group (NMSG). The next meeting of the NMSG is scheduled for July 7-9 at NATO Headquarters in Brussels, Belgium.

The stand-up of the SCO is moving forward and efforts to resolve staffing, office



space and funding issues continue. Positive responses have been received from several Nations in the form of Voluntary National Contributions (VNCs) to support the staffing of the office until funding and staffing issues are resolved. Additional VNCs are leading to early skill-building

technical activities in areas that include HLA application (see DiMuNDS 2000 article, p. X) and education (see M&S Education article, p. X).

Planning is underway for the first NATO M&S Conference. The SCO-supported conference will be held in Norfolk, Virginia, Oct. 28-29. It is being held in conjunction with the Old Dominion University (ODU)/and Supreme Allied Commander, Atlantic (SACLANT) supported International Modeling and Simulation Week. Plans for the International M&S Week include a Partnership for Peace Education and Training Conference (Oct. 25-26), an Industry Exposition and Seminar Series (Oct. 26-28) and the NATO M&S Conference (Oct. 28-29).

For more information contact Leon Armour, (703) 824-3421, larmour@msis.dmsi.mil.

Paramount

Continued from p. 11

according to the PDE team. Video and audio are the means to help you get to know the characters. But it is the characters and the story that draw the participant into the event and create a compelling feeling that it *is* 2010 and that these are *real* crises.

Final Flurry is conducted as a five-day seminar-style event. The students are divided into approximately 20 seminar groups containing a heterogeneous mix of military and non-military expertise. Non-military participants are usually senior civil servants from the executive branch, including the Departments of State, Justice, Treasury, Transportation and Interior.

The faculty seminar leader combines elements from the multimedia package into a coherent sequence to lead the seminar group through a story. Along the way the seminar group is presented with a set of problems to address, ranging from taskers from a fictitious National Security Advisor to briefings to the press. The faculty seminar leader uses the products generated by the seminar group to steer the next day's story. He controls the training event by steering the seminar group away from one crisis and toward another as he sees fit.

For more information contact Marnie Salisbury, (703) 883-7064, marnie@mitre.org.

C4I-to-Sim

Continued from p. 11

dynamically react to those commands in an appropriate manner, potentially affecting the evolving CTP and thus continuing to stimulate the normal tasks of the C4I system operator.

The initial integration of the NSS and GCCS-M was successfully completed during the week of May 10. During that testing it was demonstrated that the NSS could generate and send the appropriate track information, and that this information could be effectively displayed on the GCCS-M workstation. In addition, testing demonstrated that GCCS-M could send, and NSS could receive, Position of Intended Movement (PIM) Track commands. Additional capabilities will be incorporated in the coming months to create a more fully functional training environment for C4I system operators.

For more information contact Bob Lutz, 240-228-7599, robert.lutz@jhuapl.edu, or Marnie Salisbury, (703) 883-7064, marnie@mitre.org.

Tiger Team

Continued from p. 15

are consistent. The data will be delivered to customers via standard data formats or interchange specifications. For M&S users, this will typically be the SEDRIS. Users can specify

other non-SEDRIS transmittals as agreed upon and supported by the providers.

The results of the Tiger Team's efforts will give the MSEAs and DMSO a plan of action to help guide the future direction of these major programs. As such, the Integration Strategy will be a living document that will need to be revisited and updated at least annually. There are potential business opportunities for industry to play in this strategy which will be discussed in a follow-up *DMSO News* article later this year.

Questions regarding the Tiger Team and Integration Strategy should be directed to any one of the MSEA Office Chiefs: CDR John D. Liechty, ASNE MSEA, (828) 271-4210, liechtyj@afccc.af.mil; Dr. Donna Blake, Ocean MSEA, (703) 575-2880, dblake@msis.dmsi.mil; or Maj Steve Hledik, Terrain MSEA, (301) 227-2751, Hlediks@nima.mil.

M&S Education

Continued from p. 7

"The DMSO has presented its basic M&S courses and technical program training products to over 1000 people so far this year," said Stanford, "and the demand for the courses and instructional materials continues to grow. People owe it to themselves, their co-workers, and their respective agencies to find out what they offer."

For more information visit the M&S Education Web site at <http://www.education.dmsi.mil>.

DiMuNDS 2000 demos planned for July 2000, project will demo multinational HLA federation

By Rich Briggs
DMSO HLA Cadre

Demonstrations of the federation execution of the Distributed Multi-National Defense System (DiMuNDS) 2000 federation, which is being developed under a cooperative agreement between France, Germany, the Netherlands, the North Atlantic Treaty Organization (NATO) C3 Agency, the United Kingdom, and the United States, are planned to commence in July 2000.

The NATO has developed and adopted a Modeling and Simulation (M&S) Master Plan that provides guidance for the establishment of a NATO M&S capability. While orga-

nizations' offerings that support the project's initial focus on the Land Component Commander training within a joint operational context. The simulations chosen can be extended/supplemented to support training of additional Component Commanders after the proof-of-principle has been demonstrated. The set of simulations represent four countries and include functionality for air tasking, air-to-air combat, air-to-ground combat, ground-to-ground combat, maritime and logistics, and command and control. In addition, a set of tools will provide run-time support of the federation execution. Each of the participating systems is listed below.

SYSTEM	COUNTRY	DESCRIPTION / ROLE
Joint Theater Level Simulation (JTLS)	UK	JTLS is an aggregate simulation that will provide the maritime operations, logistics support, and some command and control.
ALICE	GE	ALICE will provide air to air combat and air to ground combat by interacting with the KIBOWI system.
STRADIVARIUS	FR	Stradivarius will provide air mission and enhanced air command operations.
KIBOWI	NL	KIBOWI will provide all ground to ground combat and ground to air combat by interacting with the ALICE system.
Federation Management Tool (FMT)	US	The FMT will provide run-time monitoring and control of the federation execution.
Federation Verification Tool (FVT)	US	The FVT will provide run-time monitoring of the federation execution to compare the actual execution to the execution plan.
Data Collection Tool (DCT)	US	The DCT will provide data collection and analysis capabilities to the federation execution.

nizational and procedural details are being developed, technical pre-pathfinder activities are being conducted to build skills within the NATO community and demonstrate the technical and procedural viability of using the Defense Department's High Level Architecture (HLA) as the prescribed foundation for NATO federations.

The DiMuNDS 2000 project will develop and demonstrate a multi-national HLA federation designed to address the requirements posed by an actual operational application. This project is the first step to support the NATO M&S Master Plan requirement of supporting the Commander, Joint Task Force (CJTF) computer-aided exercise (CAX) training. The project will develop a working HLA federation execution that initially focuses on training the Land Component Commander within a joint operational context. The federation will include explicit representation of both air and naval command elements. The federation will be developed based upon inputs from across the CJTF component commands to ensure an open and extensible Federation Object Model (FOM) and reusable federate components that can be leveraged for future NATO CJTF federations.

A set of simulations were chosen from the NATO "Multi-National Working Group (MNWG) on Interoperability of Operational Environment Simulation Models" representa-

The DiMuNDS 2000 project will span all five phases of the HLA Federation Development and Execution Process (FEDEP) model:

- Define Requirements
- Develop Conceptual Model
- Design and Develop Federation
- Integrate and Test Federation, and
- Execute Federation and Analyze Results.

For more information contact Rich Briggs, (703) 658-7960, rbriggs@virtc.com.

Editor's Note: See the related NATO article on p. 9.

• HLA Help Desk •



Have a question about the HLA? Send your query to the HLA Help Desk at hla@msis.dmsi.mil. We'll get you an answer.

DMSO, Paramount collaborate to support ICAF's Final Flurry, analyze value of multimedia

By Marnie Salisbury
DMSO HLA Cadre

In early June, Paramount Digital Entertainment (PDE) and the Defense Modeling and Simulation Office (DMSO) will bring a new multimedia package of training materials to the Industrial College of the Armed Forces (ICAF) at the National Defense University in Washington, DC, to support the ICAF's capstone exercise called "Final Flurry."

The June event is a test for the PDE/DMSO product. A team of observers from DMSO and ICAF will be collecting data and evaluating the benefits of the introduction of the integrated multimedia package. They will also examine the start-up costs and recurring maintenance costs associated with keeping the story fresh and realistic over time. The results of this analysis will determine

whether the multimedia package becomes a regular part of the ICAF curriculum or not. "We believe that this approach is the way of the future for seminar-style training events," says Dr. Judith Dahmann, DMSO Chief Scientist. "The question now is how to do it in a cost-effective way."

The multimedia package includes video clips, audio clips and a simple Intranet information system that gives the participants access to maps, e-mail and archived intelligence reports. The integrated elements of the package support and augment the basic scenario developed for the Final Flurry capstone exercise by the ICAF faculty. This story includes context, characters and plot points for four fictitious crises in the world in the year 2010. Story and character are key

See *PARAMOUNT*, p. 9

DMSO sponsors new experiment in C4I system-to-simulation interoperability

By Bob Lutz
DMSO HLA Cadre

The Defense Modeling and Simulation Office (DMSO) has recently sponsored a new experiment in C4I system-to-simulation interoperability.

The experiment, part of a larger partnership effort, focuses on C4I systems and Naval simulation to demonstrate the feasibility and utility of linking Defense Information Infrastructure Common Operating Environment (DII COE)-based C4I systems with simulations via the DoD High Level Architecture (HLA) for the purpose of C4I system operator training.

Secondary objectives include the development of a reusable Federation Object Model (FOM) subset for future federations that include both C4I systems and simulations, and to exercise the HLA Federation Development and Execution Process (FEDEP) in a C4I system operator training application.

The primary participants in this federation include the Global Command and Control System - Maritime (GCCS-M) and the Naval Simulation System (NSS). The GCCS-M is the Naval command and control system. It provides real-time interfaces to a variety of existing communications and computer systems. The GCCS-M is currently operational on most surface combatants and in numerous command centers and Tactical Support Centers throughout the U.S. Navy. The NSS is a quantitative force operations assessment tool, capable of simulating space, air, naval and land forces engaged in single- or multiple-contingency operations at varying levels of user-selectable resolution.

In this experiment, the NSS will simulate anti-submarine warfare (ASW) operations in an unclassified Tsushima Straits scenario. Throughout the execution of the scenario, the NSS will export dynamic, evolving Common Tactical Picture (CTP) information to the GCCS-M via the HLA Runtime Infrastructure (RTI), which will then be displayed on an actual GCCS-M workstation display.

Based on this information, the GCCS-M operator will be able to initiate and direct certain battlefield events via commands sent to the NSS as HLA interactions. The NSS will then

See *C4I-TO-SIM*, p. 9

Going to press ...

Two commercially published HLA-related books will go to press this summer. Here are synopses:

Creating Computer Simulation Systems: an Introduction to the High Level Architecture

By Frederick Kuhl, Judith Dahmann, Richard Weatherly. Foreword by Hon. Anita Jones, former Director, Defense Research and Engineering.

Prentice Hall, ISBN 0-13-022511-8

This book is a comprehensive introduction to the DoD High Level Architecture (HLA), designed for decision makers and technical professionals. The book includes:

- Overview of the HLA's programmatic origin and business rationale
 - Overview of the HLA as an architecture
 - Extended tutorial example: technical details of applying the HLA described through design of a complete HLA federation
 - Advanced topics in HLA application
- It comes with a CD-ROM containing
- Complete running code for an implementation of the tutorial example
 - Complete implementation of the HLA Runtime Infrastructure (RTI) for Windows-compatible and other computers
 - HLA reference documents.

Parallel and Distributed Simulation Systems

By Richard Fujimoto
Wiley Interscience

Parallel and Distributed Simulation Systems gives an in-depth treatment of technical issues concerning the realization of parallel and distributed simulation systems such as the HLA's RTI. It is intended for technical professionals or for use as a textbook in upper division undergraduate or introductory graduate level courses in parallel and distributed simulation systems. A particular emphasis of the book is distributed algorithms for implementing time management services. Examples from the HLA are included to illustrate important concepts.

The book has three parts. The first covers applications and fundamental concepts in discrete event simulation. The second is primarily concerned with parallel and distributed simulations for analytic applications. The third is concerned with distributed virtual environments. The contents are:

Part I: Introduction

- Background and Applications
- Discrete Event Simulation Fundamentals

Part II: Parallel and Distributed Discrete Event Simulation

- Conservative Synchronization Algorithms
- Time Warp
- Advanced Optimistic Techniques
- Time Parallel Simulation Algorithms

Part III: Distributed Virtual Environments:

- Distributed Virtual Environments: an Introduction
- Networking and Data Distribution
- Time Management and Event Ordering

DMSO completes eight-month review of CMMS Data Dictionary, analysis of DDDS

By Bruce A. Harris
CMMS Data Dictionary Program Manager

The Defense Modeling and Simulation Office (DMSO) has just concluded an eight-month review of the CMMS Data Dictionary (DD), long recognized for its potential as a key resource for mission space developers.

The study encompassed an identification of doctrine and systems relevant to two major Service modeling and simulation (M&S) programs – the Army's Warfighter Simulation (WARSIM) 2000 program and the Air Force's National Air and Space [Warfare] Model (NASM) – a Validation and Verification (V&V) of references used in the existing CSS data base, and a formal V&V of lexicon items.

Further, suitable "nouns," "verbs," and other semantic elements were identified for potential inclusion in the Conceptual Models of the Mission Space (CMMS) Data Dictionary and the Object Model Data Dictionary that supports DoD High Level Architecture (HLA) needs in developing Simulation Object Models and Federated Object Models. Lastly, an analysis of the DoD Defense Data Dictionary System (DDDS) was conducted to recommend lexicon items for incorporation into the DDDS.

New Approaches and New Tools

The DMSO Verification, Validation, and Accreditation (V&V&A) Recommended Practices Guide (November 1996, <http://www.dmsomil/dmsomil/docslib/mspolicy/vva/rpg>) was used as a basic reference. However, the Guide focuses on models and simulations rather than data. Therefore, business rules were identified as absolutely essential for the different process work. Specific rules were developed and approved by the DMSO for V&V of CMMS DD Current Content, Capture Tool Use, and Mapping and Matching Common Syntax and Semantics (CSS) DD Lexicon Items. Also instrumental were existing business rules for the Research Schema and Logic for CSS Term Data Capture.

Because existing CMMS CSS work had no predecessor, CMMS DD reviewers had wide latitude in the approaches that could be taken in the initial V&V work. The CSS is actually composed of a lexicon (dictionary) embedded in a domain-specific taxonomy, common representation templates (for the Entity-Action-Task-Interaction components), and Computer Aided Software Engineering (CASE) tool-specific style guides. The focus was on the lexicons themselves – nouns, verbs, and processes – which initially numbered over 10,000 data items derived from over 650 data sources.

Innovative approaches fell into three categories: processes for the conduct of the V&V, business rules and software tools. Processes were developed for a CSS Requirements Analysis, a NASM/WARSIM System Analysis, a NASM/WARSIM Doctrine Analysis, a Lexicon V&V Process, a CSS "Fill" (new lexicon candidate items) divided into a Data Process Selection Process and a Data Capture Process, and a Lexicon Mapping and Matching Process. This last process addressed the mapping and matching of both existing lexicon items and new lexicon candidate items to the OMDD. It was accomplished in two steps with the

outcome being the recommended lexicon item list for inclusion in the DDDS.

The last category of innovative approaches involved the use of tools for V&V. While the Data Analysis and Reconciliation Tool (DART), 2.3 Beta version, was available for the mapping and matching process work, no tools existed to help with a majority of the detail-oriented V&V and fill work. Thus, Microsoft Access-based tools were developed to permit decentralized reviews of the existing lexicon items and identification of new fill items for ground, air and sea domains, and cross-domain activities. The tools featured drop-down lists, enforcement of business rules, and support for "Filtering" and "Queries" that greatly improved productivity and promoted accuracy and completeness – a very pragmatic approach to a complex requirement tied to a short production schedule.

Conclusions and Lessons Learned

There are a number of specific results, observations and lessons learned keyed to the processes described above. These, as well as the detailed final report, will be made available on the DMSO Web site at <http://www.dmsomil/> under the title, "Final Report: Conceptual Models of the Mission Space Data Dictionary." However, several general conclusions and lessons learned are worth emphasizing.

Business Rules. Their usefulness in helping "consumers" understand the underlying principles and execution of any project cannot be overemphasized. If business rules are absent or written "after the fact," the V&V task is greatly complicated. While there will always be an element of subjectivity in applying business rules, and business rules necessarily "evolve" over time, to the extent possible, every effort should be made to establish objective criteria. This applies to the population of the lexicons themselves and any V&V efforts.

Sources. Any efforts expended to provide Authoritative Data Sources for CSS, OMDDS, DDDS, etc., is exceptionally worthwhile. A common authoritative resource serves the purpose of providing access to cross-domain data products, while informing the cross-domain user of the producer's intent. While the trend is toward "paperless" resource repositories, instant access through the World Wide Web is questionable in execution. Disappearing links, "mirror" web sites and the increasing concern over security of sites all serve to lengthen access times and raise source credibility issues.

Taxonomies. The CSS is a tool that intends to bridge the gap between the "warfighters'" language and the simulation developers' unfamiliarity with that language. The use of "taxonomies" or "ontologies" should be designed to capture term-definition-domain combinations. While it is recognized that the taxonomy employed in the CSS is critical to the process that produces the common format used to store data in the CMMS library, it is more difficult to champion the applicability of the taxonomy to the broader user community. A valid issue is whether a "global" taxonomy exists or should exist.

See CMMS DATA DICTIONARY, p. 13

UOB Toolset cuts development time of UOB data

By Mike Hopkins
UOB Program Manager,
Furman Haddix
UOB Technical Lead
and Bruce Harris
UOB User Advocate

The preparation of simulation input data is both manpower intensive and time consuming. One area where this is routinely evident is in the preparation of unit order of battle (UOB) data describing military organizations and their associated personnel and equipment.

The majority of DoD simulations require UOB data that covers many echelons. Quite often, these UOB data preparation efforts take the form of "stubby pencil" exercises with the data developer accessing multiple documents describing units and their characteristics. At best, UOB data developers access multiple online databases to gather the necessary data, requiring the mastery of multiple database interfaces and a variety of data structures.

For many simulations, both friendly and hostile force information is required, and such data has never been available from a single source. While most UOB data originates from classified sources, operational restrictions require that many simulations operate in an unclassified environment. The necessary unclassified data has never been readily available.

These needs led the Defense Modeling and Simulation Office (DMSO) to develop the UOB Toolset. The toolset provides simulation developers with consistent and authoritative UOB data without the level of effort previously spent acquiring, processing and maintaining UOB data for start-exercise data loads. In effect, the UOB Toolset acts as

a central clearinghouse for both friendly and hostile, and classified and unclassified UOB data. Early experiences using the UOB Toolset from the Air Combat Environment Test and Evaluation Facility (ACETEF) have proven that UOB Toolset use can dramatically cut the development time for simulation UOB data.

Most importantly, the UOB Toolset provides a library of both classified and unclassified authoritative data from several producers of UOB data, including the Defense Intelligence Agency, National Ground Intelligence Center, and Office of the Secretary of Defense, Program Analysis and Evaluation. The UOB Toolset currently encompasses U.S. forces data from the Conventional Forces Database and data for other forces from the Modernized Integrated Database (MIDB). Both of these sources provide information at the Secret level. To satisfy the need for unclassified UOB data, the toolset provides unclassified foreign forces data via an extract from the Force Tracking Information System (FORTRIS) database and generic U.S. units from the Global Command and Control System unclassified unit type data. This unclassified data is also accessible in the classified version of the UOB Toolset.

In addition, the UOB Toolset contains a published, common data interchange format (DIF) for UOB data. This UOB DIF facilitates use of UOB data, independent of the source or producer's original format. A simple ASCII fixed-column format based on the DoD Data Dictionary System (DDDS) is currently defined for UOB data. Programmers can depend on this format to remain stable for them to write interface programs to

transfer the data in this format to their desired application, simulation or database.

The UOB Data Access Tool (DAT) has been developed for a variety of computing platforms, making effective use of this data a simple matter. Current UOB DAT capabilities include browsing UOB data in a graphical format, constructing and saving task forces from this data and exporting the resulting data using the UOB DIF. Distributed computing in the UOB Toolset allows users to access authoritative UOB data from multiple producers across the public or classified Internet, without having to provide local storage of the original UOB data.

New capabilities under development for the UOB Toolset include access to additional authoritative UOB data sources, including out-year data projections, readiness data, and characteristics and performance data. New DAT capabilities include representations for multiple types of unit command relationships and alternative displays of unit relationships.

Information about the UOB Toolset is available through the DMSO Web site at <http://www.dmsomil/>, under the Projects link. For more information about the UOB project contact:

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(703) 824-3432
mhopkins@msis.dmsomil

Furman Haddix
UOB Technical Lead
(512) 835-3500
furman@arlut.utexas.edu

CMMS Data Dictionary

Continued from p. 12

CMMS DD Program Partners

The DMSO continues to work closely with the NASM and WARSIM programs, as well as new potential customers, to understand better the needs and uses of CSS. Further, the partnership still includes the CMMS CSS produced by Innovative Management Concepts, Inc., and the Multiple Taxonomy Browser of COLSA Corporation. M&S community involvement remains critical for the development of data dictionaries to meet everyone's needs.

Next Steps

1999 efforts are focusing on taxonomy sufficiency and applicability, research and development of M&S-approved taxonomies, mapping and matching of existing taxonomies to M&S taxonomies and continued lexicon fill activities. The CSS effort is also being more closely allied with the Formalized Data Product Knowledge Acquisition Tool (FDP KAT) discussed elsewhere in this newsletter.

The CMMS Data Dictionary has been the subject of several DMSO News articles in 1998 and they are available at <http://www.dmsomil/DMSONEWS/archive/html>.

For more information ...

For more information about the CMMS Data Dictionary Project contact:

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Bruce Harris
CMMS Data Dictionary Project Manager
Dynamics Research Corporation
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Looking for KATSUP?

KAT Compendium Web site has answers, KAT SUPport

By Wayne Randolph
KAT Technical Support
and Cynthia Tuttle
KAT Project Leader

What are 'KAT' and 'KATSUP'?"

KAT is the the Defense Modeling and Simulation Office's (DMSO) Formalized Data Product (FDP) Knowledge Acquisition Tool (KAT). KATSUP is the acronym for the FDP-KAT technical SUPport team. The technical support team provides answers on installation and usage.

The KAT is a type of development and capture tool within the Conceptual Model of the Mission Space (CMMS) Toolset Architecture. The purpose of a development and capture tool is to assist Subject Matter Experts (SMEs) and Knowledge Engineers (KEs) in gathering mission-space information for their mission space models during knowledge acquisition. Examples of develop and capture tools include Computer Aided Software Engineering (CASE) tools and test-based forms. The KAT combines features from CASE tools and text-based forms into an economical solution for modeling and simulation (M&S) knowledge acquisition needs.

There are numerous developers that are currently using the KAT to develop mission space objects. These developers include members of the Joint Simulation System (JSIMS) Enterprise. The developers are located in different areas across the United States.

The KAT Compendium Web site

Where do you go for information about the KAT? The KAT Compendium Web site at <http://ORL01.drc.com/kat/>.

The KAT Compendium provides general information about the KAT and a number of resources to help customers resolve problems. The

"KAT FAQ" page has answers to common questions handled by the support staff, along with some tips and tricks that have been found useful. The "What's New" page displays an up-to-date listing of changes to our customer support and provides notices regarding product updates. The "Discussion" page provides a discussion group where customers can post articles about problems. There is information on who to contact to obtain a copy of KAT. There is also an e-mail address – katsup@drc.com – for contacting the KAT technical support team. The KAT technical support and training team can help with the installation and usage of the tool. They have gone to customer locations to provide initial training.

For more information ...

The KAT Compendium is available online at <http://ORL01.drc.com/kat/>. For more information contact:

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Third MSRR Users Conference

MSRR users to define multi-repository architecture; SBA figures prominently in conference discussions

By Gary Misch
MSRR Project Lead

The DMSO-sponsored Modeling and Simulation Resource Repository (MSRR) program conducted its third users conference on April 28-29.

Nearly 200 attendees participated in plenary sessions and multi-track workshops. Additionally, attendees had an opportunity to view demonstrations of all MSRR associated systems. Participant systems and programs included:

- Army MSRR (Army Model and Simulation Office (AMSO))
- Navy Modeling and Simulation (M&S) Information System (Navy M&S Management Office (NAVMSMO))
- Air Force MSRR (Air Force Agency for Modeling and Simulation (AFAMS))
- Defense Intelligence Agency MSRR (M&S Executive Agent (MSEA) for Intelligence)

- Master Environmental Library (MSEA for Oceans)
- Simulation Based Acquisition (SBA) Office
- C4ISR Decision Support Center
- MSRR central services system

A highlight of the conference was an entire day devoted to Simulation Based Acquisition (SBA), which included a panel discussion concerning SBA activities and future vision, led by Col. Kenneth Konwin, DMSO Director, and Ms. Robin Frost, primary point of contact for the DoD SBA initiative.

Another topic of discussion was the recent conclusion of the MSRR development team's series of interoperability experiments, in which a distributed query of dissimilar systems was tested, along with a multi-system common password implementation. The experiments will form the basis for an initial multi-repository architecture definition. In the coming months,

the expanded MSRR technical support team, including representatives from all current MSRR systems, will define an architecture that enables the easy incorporation of dissimilar repositories into the MSRR, giving users the ability to query large numbers of systems throughout the DoD from a single interface.

During the conference, Dr. Judith Dahmann, DMSO Chief Scientist, described the DoD High Level Architecture (HLA) and its development. The HLA collaborative development, using "stake holders" as part of the development team, is viewed as a model for the repository interoperability architecture.

Much of the material presented at the conference is available on the conference Web site at <http://www.msrr.dmsmo.mil/briefings/dmsmo/>.

For more information about the MSRR contact Gary Misch, (703) 575-1094, gl@msrr.dmsmo.mil, or visit the MSRR Web site at <http://www.msrr.dmsmo.mil/>.

Tiger Team takes on environmental projects

By Capt Tim Hall, USAF
DoD ASNE MSEA

Under the auspices of the Defense Modeling and Simulation Office (DMSO), the three DoD Natural Environment Modeling and Simulation Executive Agents (MSEAs) have been executing the Synthetic Data Representation and Interchange Specification (SEDRIS), the Master Environmental Library (MEL), the environmental node of the Modeling and Simulation Resource Repository (MSRR), and Environmental Scenario Generator (ESG) projects.

These projects support the DoD Modeling and Simulation (M&S) Master Plan (DoD 5000.59-P) objective to provide authoritative data representing the atmosphere, space, oceans and terrain.

In February 1999, the office chiefs of the three natural environment MSEAs chartered the Synthetic Natural Environment (SNE) Data Flow Tiger Team to ensure that these three programs, along with the emerging M&S data Just-in-Time (JiT) production capabilities of Operational Providers, will coalesce to provide a capability to produce the integrated, physically consistent environmental representations required by DoD's models and simulations.

The team is composed of representatives from the three natural environment MSEAs and the DMSO, as well as individuals with MEL, ESG, and SEDRIS technical expertise. The members of the Tiger Team are:

—Capt Tim Hall, Team Leader, Air and Space Natural Environment (ASNE) MSEA

—Tim Cummings, Ocean MSEA (Acton Burnell)

—Karen Williams, Terrain MSEA (National Imagery and Mapping Agency (NIMA))

—Ron Haynes, ASNE MSEA (Dynamics Research Corporation (DRC))

—John Hughes, DMSO (MITRE)

—Dr. Richard Siquig, MEL, ESG Project Manager (Naval Research Lab)

—Dr. Paul Birkel, SEDRIS Technical Advisor (MITRE)

—Dr. Bill Campbell, ASNE MSEA (Abacus)

—Dr. Louis Hembree, MEL and SEDRIS Technical Advisor (Naval Research Lab).

In the charter, the Tiger Team was given four objectives: (1) develop a DoD Natural Environment Tri-MSEA vision statement; (2) write an integration strategy that meets the vision, and documents how natural environment data will flow from producer to DoD M&S user; (3) develop a strategy implementation plan that defines a timeline of actions, as well as functional and programmatic interrelationships among the various MSEA programs; (4) identify shortfalls that exist in meeting the vision, and recommend measures to address them.

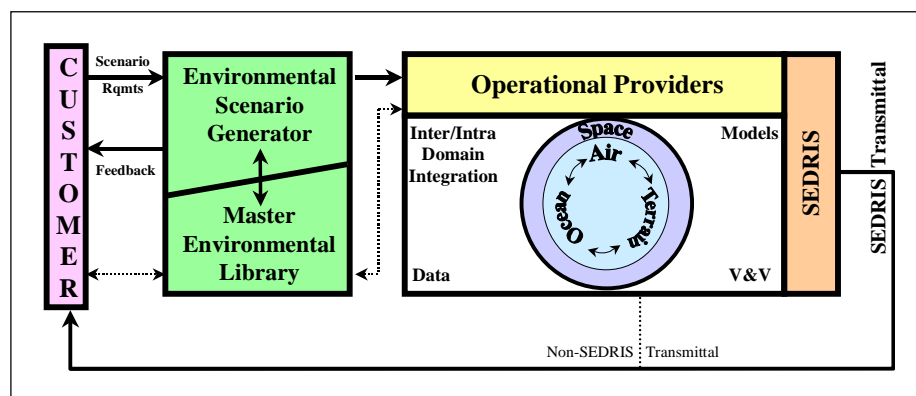
The final draft of the Integration Strategy, including its Implementation Plan, will be completed by July 1999.

To fulfill their responsibilities as outlined in DoD Directive 5000.59, the MSEAs must jointly put in place the common and general use infrastructure needed to provide authoritative environmental representations for use in DoD models and simulations. The first task of the Tiger Team was to develop a vision statement that describes the future state of this infrastructure:

“DoD M&S activities will have a readily accessible infrastructure for obtaining authoritative representations of the natural environment. Users will have a robust capability to cost-effectively acquire environmental scenarios customized to meet their requirements. When needed, approved providers will pro-

lates the customer's SNE data requirements – rocky, rainy, high waves, solar disturbances – into environmental parameters – temperature, wind, sea state – and finds historical environmental scenarios which may meet the customer's request through “mining” of reference data sets. If data from the reference data sets are not sufficient to meet a user's needs, the information returned from the mining is used to build a MEL query to search for availability among one or more MEL resource sites.

When the data needed is not available via the MEL, the ESG will have the capability to facilitate production of the data in such a way that it is properly integrated between the various domains. Operational Providers do the actual production of data using their JiT production resources and will be responsible for ensuring intra-domain consistency. They will



duce and deliver data in a standardized form that is physically consistent both within and among the Air, Ocean, Space and Terrain domains. This M&S synthetic natural environment support infrastructure will promote simulation interoperability, data re-use, and customer confidence.”

Synthetic Natural Environment (SNE) Data Flow Process

To meet the vision, the Tiger Team's second task was to develop a blueprint for a general use M&S natural environment infrastructure. The figure above depicts the future state of the process to construct and deliver an integrated authoritative representation of the natural environment. This figure is not intended to imply a single project or technology, but represents an integrated program/capability infrastructure. The major pillars of the infrastructure are the ESG, MEL, SEDRIS, and JiT Operational Providers.

The data flow process begins with a customer interacting with the ESG to request data to meet specific requirements. The ESG trans-

use in-house models and retain complete configuration control over their production processes. Operational Providers are the Services and Agencies that have responsibilities to provide environmental data to the operational community – the Air Force Weather Agency, the Naval Oceanographic Office and the NIMA. They could also be contractors who have been approved as M&S JiT resource centers. The MSEAs are identifying, and in some cases developing, the needed capabilities for this JiT production.

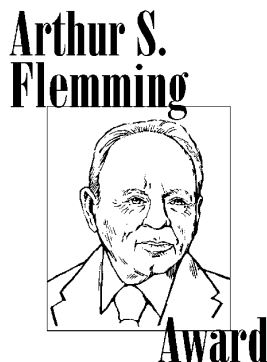
Within the inter-domain integration processes, the ESG orchestrates the flow of data production such that the appropriate models run in the correct sequences to ensure proper integration of the various domain parameters, including derived parameters required by the user. Atmosphere data, for example, goes to the ocean provider so that surface winds and waves are correlated, i.e., consistent; or atmosphere data goes to the terrain provider so that the temperature, precipitation and snow cover

See **TIGER TEAM**, p. 9

DMSO Chief Scientist wins '98 Arthur Flemming Award

By Sherrel Mock
DMSO Public Affairs

The Arthur S. Flemming Awards Commission has announced that Dr. Judith S. Dahmann, Chief Scientist for the Defense Modeling and Simulation Office (DMSO), has been selected as a 1998 Flemming Award winner in the applied science category.



Dr. Dahmann was selected for her unparalleled technical acumen and leadership in developing and implementing the DoD's High Level Architecture for modeling and simulation (M&S).

The HLA, which represents the highest priority in the DoD M&S community, is the cornerstone of the broader effort to develop a Common Technical Framework for M&S. Dr. Dahmann's efforts have contributed directly to the increased incidence of critical interoperability of models and

simulations and provided the means for cost-saving reuse of M&S components. Due to its technical excellence, the HLA is being embraced by military and civilian sectors, both nationally and internationally.

The Flemming Awards Program Commission, supported by George Washington University (GWU) and *Government Executive*

See FLEMMING AWARD, p. 6

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MSIAC contract awarded to IITRI on May 19; MSOSA to start 2-month transition on June 1

By Sherrel Mock
DMSO Public Affairs

The Defense Modeling and Simulation Office (DMSO) and the Defense Technical Information Center (DTIC) announced on May 19 that the Illinois Institute of Technology Research Institute (IITRI) in Chicago had been awarded a cost-plus-fixed-fee contract for establishment and operation of the Department of Defense (DoD) Modeling and Simulation Information Analysis Center (MSIAC). The effective date of the contract is June 1.

The Defense Supply Center - Columbus (DSCC), an organization of the Defense Logistics Agency (DLA), is the contracting activity (SP0700-99-D-0300) for the 10-year, \$3 million-per-year-for-core-services contract. The potential worth of the contract, based on government estimates, is \$193,185,003. The only guaranteed funding, however, is the \$3 million per year for core services. All other funding will come from customers who use MSIAC services. Services beyond the provided core

functions will be conducted and funded by means of separate Technical Area Tasks (TATs).

The MSIAC will merge the capabilities of two existing DoD activities: the Modeling and Simulation Operational Support Activity (MSOSA) and the modeling and simulation (M&S) capabilities of the Defense Modeling and Simulation Tactical and Technical Information Analysis Center (DMSTTIAC). The MSIAC will provide M&S services — both DoD enterprise, e.g., help-desks, and specific task order support — that will improve the effectiveness and efficiency of current M&S support contracting.

The DMSTTIAC will stand down on June 1 and the MSOSA will begin a two-month transition period of transferring all functionality to the MSIAC. The MSOSA will stand down at the end of the transition period.

"There is planning in place to ensure to the greatest possible extent that there will be no reduction in the quality or efficiency of work by the MSOSA during the transition," said Lt. Col. Harry Thompson, DMSO Operations

Division chief, "but we ask your patience -- the transition is a necessary step to a much greater capability for the future. This will be a wonderful expansion of capability in support of M&S for the Department of Defense."

The DSCC conducted the competitive procurement as part of the DTIC's IAC program. One hundred six proposals were solicited, and two were received. What is not reflected in those numbers is the extensive teaming of additional companies with the prime bidders that resulted from the diversity of tasks required by the contract. Teaming not only ensured an equally diverse range of subject matter experts to work the tasks, but also allowed companies with narrower focuses or specialized interests to participate and contribute to the team synergy.

The IITRI teamed with 13 other companies to provide the breadth of necessary skills and services. The team partners are AB Technologies, AEgis Research Corporation, Science

See MSIAC, p. 6